

# Service Instructions

Split System Wall Mounted  
Air Conditioners and Heat Pumps  
with R-410A Refrigerant



This manual is to be used by qualified, professionally trained HVAC technicians only. Goodman does not assume any responsibility for property damage or personal injury due to improper service procedures or services performed by an unqualified person.

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## IMPORTANT INFORMATION

Pride and workmanship go into every product to provide our customers with quality products. It is possible, however, that during its lifetime a product may require service. Products should be serviced only by a qualified service technician who is familiar with the safety procedures required in the repair and who is equipped with the proper tools, parts, testing instruments and the appropriate service manual. **REVIEW ALL SERVICE INFORMATION IN THE APPROPRIATE SERVICE MANUAL BEFORE BEGINNING REPAIRS.**

## IMPORTANT NOTICES FOR CONSUMERS AND SERVICERS

### RECOGNIZE SAFETY SYMBOLS, WORDS AND LABELS



### WARNING

This unit should not be connected to, or used in conjunction with, any devices that are not design certified for use with this unit or have not been tested and approved by Goodman. Serious property damage or personal injury, reduced unit performance and/or hazardous conditions may result from the use of devices that have not been approved or certified by Goodman.



### WARNING

Installation and repair of this unit should be performed **ONLY** by individuals meeting the requirements of an "Entry Level Technician" as specified by the Air Conditioning and Refrigeration Institute (ARI). Attempting to install or repair this unit without such background may result in product damage, personal injury, or death.



### WARNING

To prevent the risk of property damage, personal injury, or death, do not store combustible materials or use gasoline or other flammable liquids or vapors in the vicinity of this appliance.



### WARNING

Goodman will not be responsible for any injury or property damage arising from improper service or service procedures. If you perform service on your own product, you assume responsibility for any personal injury or property damage which may result.

To locate an authorized servicer, please consult your telephone book or the dealer from whom you purchased this product. For further assistance, please contact:

CONSUMER INFORMATION LINE  
GOODMAN® BRAND PRODUCTS  
TOLL FREE 1-877-254-4729 (U.S. only)  
email us at: [customerservice@goodmanmfg.com](mailto:customerservice@goodmanmfg.com)  
fax us at: (713) 856-1821  
(Not a technical assistance line for dealers.)

Outside the U.S., call 1-713-861-2500. (Not a technical assistance line for dealers.) Your telephone company will bill you for the call.

Outside the U.S., call 1-931-433-6101. (Not a technical assistance line for dealers.) Your telephone company will bill you for the call.



# IMPORTANT INFORMATION

## SAFE REFRIGERANT HANDLING

While these items will not cover every conceivable situation, they should serve as a useful guide.



### WARNING

Refrigerants are heavier than air. They can "push out" the oxygen in your lungs or in any enclosed space. To avoid possible difficulty in breathing or death:

- Never purge refrigerant into an enclosed room or space. By law, all refrigerants must be reclaimed.
- If an indoor leak is suspected, thoroughly ventilate the area before beginning work.
- Liquid refrigerant can be very cold. To avoid possible frostbite or blindness, avoid contact with refrigerant and wear gloves and goggles. If liquid refrigerant does contact your skin or eyes, seek medical help immediately.
- Always follow EPA regulations. Never burn refrigerant, as poisonous gas will be produced.



### WARNING

To avoid possible explosion:

- Never apply flame or steam to a refrigerant cylinder. If you must heat a cylinder for faster charging, partially immerse it in warm water.
- Never fill a cylinder more than 80% full of liquid refrigerant.
- Never add anything other than R-22 to an R-22 cylinder or R-410A to an R-410A cylinder. The service equipment used must be listed or certified for the type of refrigerant used.
- Store cylinders in a cool, dry place. Never use a cylinder as a platform or a roller.



### WARNING

#### HIGH VOLTAGE

Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.



### WARNING

To avoid possible injury, explosion or death, practice safe handling of refrigerants.



### WARNING

To avoid possible explosion, use only returnable (not disposable) service cylinders when removing refrigerant from a system.

- Ensure the cylinder is free of damage which could lead to a leak or explosion.
- Ensure the hydrostatic test date does not exceed 5 years.
- Ensure the pressure rating meets or exceeds 400 lbs.

When in doubt, do not use cylinder.



### WARNING

System contaminants, improper service procedure and/or physical abuse affecting hermetic compressor electrical terminals may cause dangerous system venting.

The successful development of hermetically sealed refrigeration compressors has completely sealed the compressor's moving parts and electric motor inside a common housing, minimizing refrigerant leaks and the hazards sometimes associated with moving belts, pulleys or couplings.

Fundamental to the design of hermetic compressors is a method whereby electrical current is transmitted to the compressor motor through terminal conductors which pass through the compressor housing wall. These terminals are sealed in a dielectric material which insulates them from the housing and maintains the pressure tight integrity of the hermetic compressor. The terminals and their dielectric embedment are strongly constructed, but are vulnerable to careless compressor installation or maintenance procedures and equally vulnerable to internal electrical short circuits caused by excessive system contaminants.

In either of these instances, an electrical short between the terminal and the compressor housing may result in the loss of integrity between the terminal and its dielectric embedment. This loss may cause the terminals to be expelled, thereby venting the vaporous and liquid contents of the compressor housing and system.

A venting compressor terminal normally presents no danger to anyone, providing the terminal protective cover is properly in place.

If, however, the terminal protective cover is not properly in place, a venting terminal may discharge a combination of

- (a) hot lubricating oil and refrigerant
- (b) flammable mixture (if system is contaminated with air)

in a stream of spray which may be dangerous to anyone in the vicinity. Death or serious bodily injury could occur.

Under no circumstances is a hermetic compressor to be electrically energized and/or operated without having the terminal protective cover properly in place.



# IMPORTANT INFORMATION

*Please read and follow the important notes below.*



## WARNING

### HIGH VOLTAGE

Disconnect ALL power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.



### Installation:

1. Always use the correct size circuit breaker and fuse. Circuit breakers should be installed on a dedicated circuit.
2. Properly ground the unit.
3. Do NOT use extension cords.
4. Ensure that the unit is mounted on a stable installation stand. Check periodically for signs of deterioration.
5. Running the unit for long periods of time during high humidity or with windows/doors open may cause condensation on furnishings.
6. The power cable should not be stretched and nothing should sit on it. Always turn the unit off before plugging or unplugging the power cable.
7. Make sure proper ventilation of conditioned space is provided.
8. Protect unit before arrival of inclement weather.
9. Do not open the inlet grill during operation of the unit.
10. Do not touch the electrostatic filter if unit is equipped with one.
11. If smoke or unusual noises emit from the unit, immediately turn off the unit and disconnect ALL power. (See warning above.)
12. Do not allow water to enter the unit. In the instance that the unit is soaked or submerged, contact an authorized servicer.
13. When the unit is not used for a long period of time, disconnect ALL power to the unit.
14. Place the outdoor unit in a location away from high traffic areas to prevent tripping or damage to the unit. Do not place objects on the unit.



## CAUTION

Hazards or unsafe practices may result in property damage, product damage, personal injury or death.

1. Always check for refrigerant leakage after installation or repair of the product.
2. Drain hose must be installed properly so water will drain away from the unit.
3. Installing the unit in an unlevel position may cause vibration or water leakage.
4. Install the outdoor unit away from vegetation as the hot air may cause damage to vegetation in close proximity.
5. To avoid personal injury, always use two people to lift or transport the unit.
6. Unit should not be installed where it may be exposed directly to sea coast conditions (sea wind or salt spray).

### Operation:

1. Do not block the inlet or outlet of airflow.
2. Do not use harsh detergents, solvents, etc., to clean the unit. A soft cloth is recommended.
3. Use caution when removing the air filter, as there may be sharp, metal edges.
4. Clean the filter every two weeks or more often, if necessary and be sure to seat the filter securely.
5. Keep hands and foreign objects away from the air outlets while the unit is in operation.



# PRODUCT FEATURES

## Indoor unit:

1. **ON/OFF operation by remote control.**
2. **Room temperature sensing.**
3. **Room temperature control.**
4. **Starting temperature control.** 5 second delay of indoor fan at start.
5. **Time delay safety control.** Approximate restart time: 3 minutes.
6. **Indoor fan speed control.** High, medium, low & breeze.
7. **Operation indication lamps.** (LED display for each mode)
8. **2-direction air vane.** Louver direction is decided by unit according to operation mode.
9. **Sleep mode auto control.** Fan is on low speed (cooling/heating) and will turn off after 7 hours.
10. **Independent dehumidification.** Used primarily for high humidity conditions/damp areas.
11. **Self-diagnosing function.** Functions in any operational mode.
12. **Air flow directional control.** Louver can be manually set at desired position or set to automatically swing up or down.
13. **Auto mode.** Unit automatically adjusts to room temperature.
14. **Anti-cold function.** Prevents the cold air burst at the beginning of the unit start up.
15. **Temperature compensation.**
16. **Defrost mode.**
17. **Auto-restart.**
18. **Flexible wiring connection.**
19. **Easy-clean panel.**
20. **Turbo (12k models).** In cooling mode, the unit will reach the pre-set temperature in the shortest time.

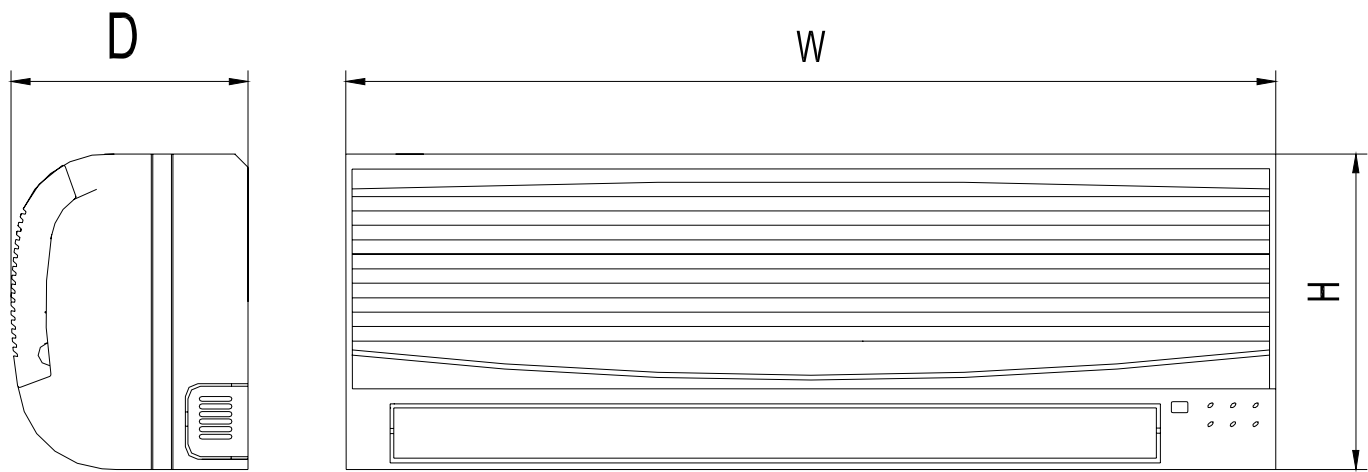
## Outdoor unit:

1. **Power relay control** The unit has a 3 minute delay between continuously ON/OFF operations.
2. **Low noise airflow system.** Bird tail propeller fan makes the outdoor unit run more quietly.
3. **Hydrophilic aluminum fin.** Applies to cooling & heating modes only. The fin improves the heating efficiency at operation mode.
4. **Reversing Valve.** Operates only in the heating operation mode, except defrosting operation.
5. **Anti-rust cabinet.** Crafted from electrolytic zinc steel sheet metal and anti-rust coated components.
6. **Valve protection cover.** Cover protects the valves and prevents water from dripping.



# PRODUCT DESIGN

## DIMENSIONS - INDOOR UNIT



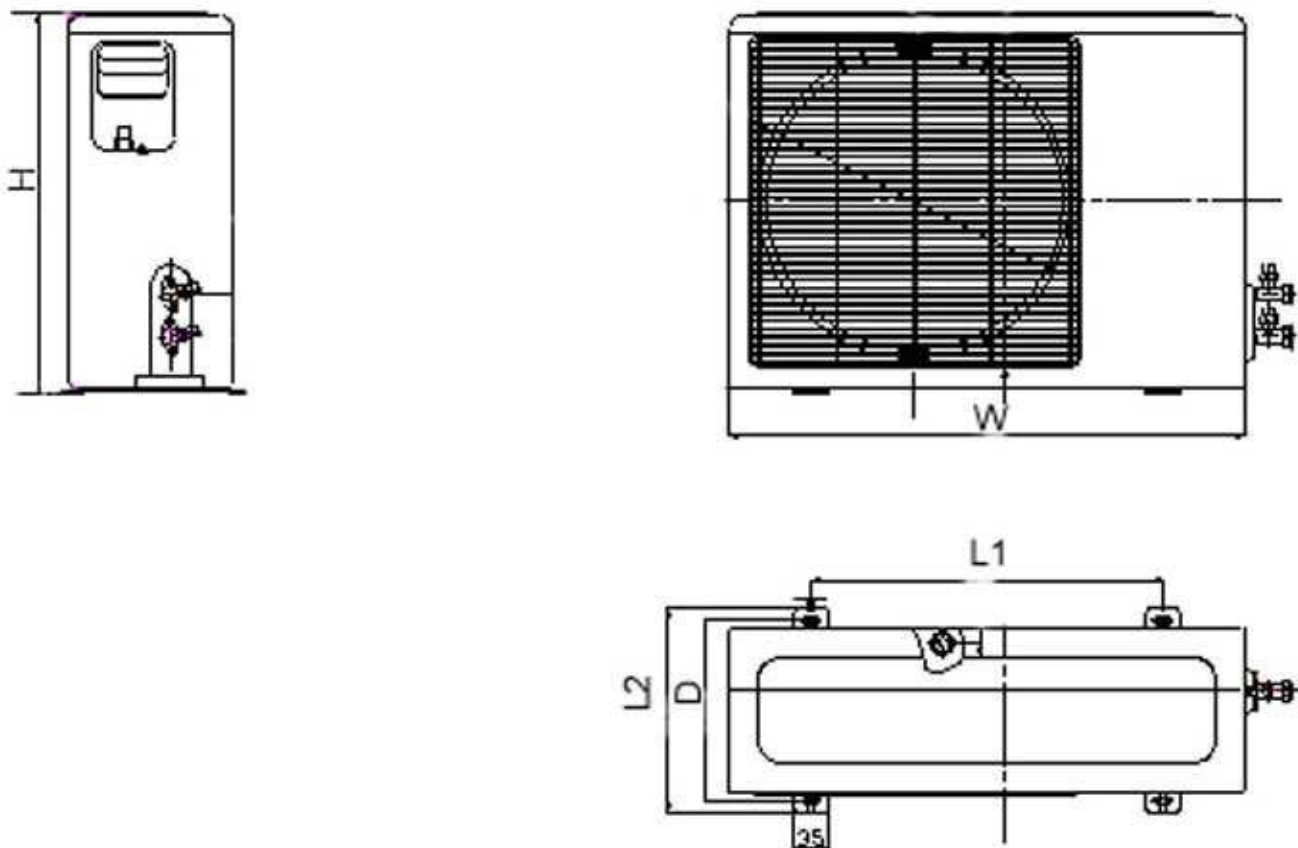
Model Indoor Unit	Dimensions - W x D x H Inches	Dimensions - W x D x H mm
MSG-12CRN1N	35-11/16 x 9-3/8 x 11-1/4	906 x 235 x 286
MSG-18CRN1N	49-1/4 x 9-1/16 x 12-13/16	1250 x 230 x 325
MSG-24CRN1N	49-1/4 x 9-1/16 x 12-13/16	1250 x 230 x 325

Dimensions in inches & mm



# PRODUCT DESIGN

## DIMENSIONS - OUTDOOR UNIT



Model Outdoor Unit	Dimensions W x D x H - Inches	L1 Inches (mm)	L2 Inches (mm)
MSG-12HRN1W	29-15/16 x 11-1/4 x 23-1/4	20-7/8 (530)	11-3/8 (290)
MSG-18HRN1W	33-1/4 x 13-3/16 x 27-3/8	22 (560)	13-3/16 (335)
MSG-24HRN1W	35-5/16 x 13 x 33-7/8	23-1/4 (590)	13-1/8 (333)

Dimensions in inches / mm



# SPECIFICATIONS

# MSG-12\*

	MSG-12CRN1	MSG-12HRN1
<b>Power Supply - Ph/V/Hz</b>	1, 208/230V/60Hz	1, 208/230V/60Hz
<b>Cooling</b>		
Capacity, Btu/H	12,000	12,000
Input, watts	1,050	1,050
Rated current - amps	4.6	4.6
SEER - Btu/w.h	13.0	13.0
<b>Heating</b>		
Capacity, Btu/h	13,000	13,000
Input, watts	1,050	1,050
Rated Current - amps	4.6	4.6
HSPF - W/W	7.7	7.7
<b>Max. Current - amps</b>	7.6	7.6
<b>Starting Current - amps</b>	21 / 23.5	21 / 23.5
<b>Compressor</b>		
Model	PA108X1C-3FZDU	PA108X1C-3FZDU
Type	Rotary	Rotary
Brand	Toshiba	Toshiba
Capacity - Btu/h	10,850 / 1,100	10,850 / 1,100
Input, watts	1,070 / 1,075	1,070 / 1,075
Rated current (RLA) - amps	5.2 / 4.8	5.2 / 4.8
Locked rotor (LRA) - amps	21 / 23.5	21 / 23.5
Thermal protector	B185-135-141E	B185-135-141E
Capacitor - µF	35µf / 450 VAC	35µf / 450 VAC
Refrigerant oil - oz. / ml	12 oz. / 350 ml	12 oz. / 350 ml
<b>Indoor Fan Motor</b>		
Model	WZDK25-38D	WZDK25-38D
Brand	Welling	Welling
Input, watts	32	32
Capacitor - µF	----	----
Speed RPM/minute (High, Med, Low)	1,270 / 1,100 / 1,000	1,270 / 1,100 / 1,000
<b>Indoor air flow - CFM (High, Med, Low)</b>	441 / 365 / 325	441 / 365 / 325
<b>Indoor air flow - (High, Med, Low) / m3/h</b>	750 / 620 / 550	750 / 620 / 550
<b>Indoor noise level - dB(A) (High, Med, Low)</b>	45 / 41 / 38	45 / 41 / 38
<b>Outdoor Fan Motor</b>		
Model	YDK36-6B	YDK36-6B
Brand	Welling	Welling
Input, watts	85	85
Capacitor - µF	2.5µF/450V	2.5µF/450V
Speed RPM/Minute	930	930
<b>Outdoor air flow - CFM</b>	1,118	1,118
<b>Outdoor air flow - m<sup>3</sup>/h</b>	1,900	1,900
<b>Outdoor noise level - dB(A)</b>	55	55
<b>Refrigerant type R410A - Oz. / g</b>	48 oz. / 1350 g	48 oz. / 1350 g
<b>Design pressure - PSI / 'MPa</b>	653 / 4.5	653 / 4.5
<b>Refrigerant Piping</b>		
Liquid side / gas side (Inches / mm)	1/4" / 1/2" - Φ6.35 / Φ12.7	1/4" / 1/2" - Φ6.35 / Φ12.7
Max. refrigerant pipe length (feet / m)	33' / 10 m	33' / 10 m
Max. difference in level (feet / m)	16' / 5 m	16' / 5 m
<b>Operation temp. - (°F) / (°C)</b>	63°F - 86°F / 17°C - 30°C	63°F - 86°F / 17°C - 30°C
<b>Ambient temp. - (°F) / (°C)</b>	19°F - 113°F / -7°C - 45°C	19°F - 113°F / -7°C - 45°C
<b>Approximate Application area - Sq. ft. / m<sup>2</sup></b>	194 - 280 / 18 -- 26	194 - 280 / 18 -- 26

**NOTE:** The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

Specifications are subject to change without prior notice.



# SPECIFICATIONS

# MSG-18\*

	MSG-18CRN1	MSG-18HRN1
<b>Power Supply - Ph/V/Hz</b>	1, 208/230V/60Hz	1, 208/230V/60Hz
<b>Cooling</b>		
Capacity, Btu/H	18,000	18,000
Input, watts	1,560	1,530
Rated current - amps	6.8	6.7
SEER - Btu/w.h	13.0	13.0
<b>Heating</b>		
Capacity, Btu/h	---	18,000
Input, watts	---	1,630
Rated Current - amps	---	7.1
HSPF - W/W	---	7.7
<b>Max. Current - amps</b>	9.2	10.2
<b>Starting Current - amps</b>	32.6	32.6
<b>Compressor</b>		
Model	PA150X2CS-3KUU	PA150X2CS-3KUU
Type	Rotary	Rotary
Brand	Toshiba	Toshiba
Capacity - Btu/h	15,166 / 15,354	15,166 / 15,354
Input, watts	1,505 / 1,510	1,505 / 1,510
Rated current (RLA) - amps	7.30 / 6.65	7.30 / 6.65
Locked rotor (LRA) - amps	32.6	32.6
Thermal protector	UP3RE0391-T39	UP3RE0391-T39
Capacitor - $\mu$ F	40 $\mu$ F / 450 VAC	40 $\mu$ F / 450 VAC
Refrigerant oil - oz. / ml	25 oz. / 750 ml	25 oz. / 750 ml
<b>Indoor Fan Motor</b>		
Model	YDK31-6B	YDK31-6B
Brand	Welling	Welling
Input, watts	55	55
Capacitor - $\mu$ F	3	3
Speed RPM/minute (High, Med, Low)	1,070 / 1,000 / 960	1,070 / 1,000 / 960
<b>Indoor air flow - CFM (High, Med, Low)</b>	618 / 541 / 489	618 / 541 / 489
<b>Indoor air flow - (High, Med, Low) / m3/h</b>	1050 / 920 / 830	1050 / 920 / 830
<b>Indoor noise level - dB(A) (High, Med, Low)</b>	45 / 43 / 41	45 / 43 / 41
<b>Outdoor Fan Motor</b>		
Model	YDK53-6KB	YDK53-6KB
Brand	Welling	Welling
Input, watts	165	165
Capacitor - $\mu$ F	3 $\mu$ F/450V	3 $\mu$ F/450V
Speed RPM/Minute	840	840
<b>Outdoor air flow - CFM</b>	1,471	1,471
<b>Outdoor air flow - m<sup>3</sup>/h</b>	2,500	2,500
<b>Outdoor noise level - dB(A)</b>	59	59
<b>Refrigerant type R410A - Oz. / g</b>	71 oz. / 2000 g	71 oz. / 2040 g
<b>Design pressure - PSI / 'MPa</b>	653 / 4.5	653 / 4.5
<b>Refrigerant Piping</b>		
Liquid side / gas side (Inches / mm)	1/4" / 1/2" - $\Phi$ 6.35 / $\Phi$ 12.7	1/4" / 1/2" - $\Phi$ 6.35 / $\Phi$ 12.7
Max. refrigerant pipe length (feet / m)	33' / 10 m	33' / 10 m
Max. difference in level (feet / m)	16' / 5 m	16' / 5 m
<b>Operation temp. - (°F) / (°C)</b>	63°F - 86°F / 17°C - 30°C	63°F - 86°F / 17°C - 30°C
<b>Ambient temp. - (°F) / (°C)</b>	64°F - 113°F / 18°C - 45°C	19°F - 113°F / -7°C - 45°C
<b>Approximate Application area - Sq. ft. / m<sup>2</sup></b>	323 - 431 / 40 - 30	323 - 431 / 30 - 40

**NOTE:** The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

Specifications are subject to change without prior notice.



# SPECIFICATIONS

# MSG-24\*

	MSG-24CRN1	MSG-24HRN1
<b>Power Supply - Ph/V/Hz</b>	1, 208/230V/60Hz	1, 208/230V/60Hz
<b>Cooling</b>		
Capacity, Btu/H	24,000	24,000
Input, watts	2,000	2,000
Rated current - amps	8.8	8.8
SEER - Btu/w.h	13.0	13.0
<b>Heating</b>		
Capacity, Btu/h	---	24,000
Input, watts	---	2,000
Rated Current - amps	---	8.8
HSPF - W/W	---	7.7
<b>Max. Current - amps</b>	14	14
<b>Starting Current - amps</b>	34.8	34.8
<b>Compressor</b>		
Model	PA200X2CS-3MKUU	PA200X2CS-3MKUU
Type	Rotary	Rotary
Brand	Toshiba	Toshiba
Capacity - Btu/h	19820 / 20130 $\pm$ 5%	19820 / 20130 $\pm$ 5%
Input, watts	2000 / 1980 $\pm$ 5%	2000 / 1980 $\pm$ 5%
Rated current (RLA) - amps	9.70 / 8.75 $\pm$ 5%	9.70 / 8.75 $\pm$ 5%
Locked rotor (LRA) - amps	34.8	34.8
Thermal protector	UP3SE0396-T39	UP3SE0396-T39
Capacitor - $\mu$ F	50 $\mu$ f / 450V	50 $\mu$ f / 450V
Refrigerant oil - oz. / ml	25 oz. / 750 ml	25 oz. / 750 ml
<b>Indoor Fan Motor</b>		
Model	YDK50-4B	YDK50-4B
Brand	Welling	Welling
Input, watts	82 / 69 / 58	82 / 69 / 58
Capacitor - $\mu$ F	3	3
Speed RPM/minute (High, Med, Low)	1,260 / 1,100 / 990	1,260 / 1,100 / 990
<b>Indoor air flow - CFM (High, Med, Low)</b>	677 / 600 / 581	677 / 600 / 581
<b>Indoor air flow - (High, Med, Low) / m3/h</b>	1150 / 1020 / 930	1150 / 1020 / 930
<b>Indoor noise level - dB(A) (High, Med, Low)</b>	47 / 44 / 42	47 / 44 / 42
<b>Outdoor Fan Motor</b>		
Model	YDK100-6EB	YDK100-6EB
Brand	Welling	Welling
Input, watts	160	160
Capacitor - $\mu$ F	4 $\mu$ f / 450V	4 $\mu$ f / 450V
Speed RPM/Minute	740	740
<b>Outdoor air flow - CFM</b>	1,471	1,471
<b>Outdoor air flow - m<sup>3</sup>/h</b>	2,500	2,500
<b>Outdoor noise level - dB(A)</b>	59	59
<b>Refrigerant type R410A - Oz. / g</b>	85 oz. / 2400 g	86 oz. / 2450 g
<b>Design pressure - PSI / 'MPa</b>	653 / 4.5	653 / 4.5
<b>Refrigerant Piping</b>		
Liquid side / gas side (Inches / mm)	3/8" / 5/8" - $\Phi$ 9.53 / $\Phi$ 16	3/8" / 5/8" - $\Phi$ 9.53 / $\Phi$ 16
Max. refrigerant pipe length (feet / m)	33' / 10 m	33' / 10 m
Max. difference in level (feet / m)	16' / 5 m	16' / 5 m
<b>Operation temp. - (°F) / (°C)</b>	63°F - 86°F / 17°C - 30°C	63°F - 86°F / 17°C - 30°C
<b>Ambient temp. - (°F) / (°C)</b>	64°F - 113°F / 18°C - 45°C	19°F - 113°F / -7°C - 45°C
<b>Approximate Application area - Sq. ft. / m<sup>2</sup></b>	431 - 603 / 40 - 56	431 - 603 / 40 - 56

**NOTE:** The noise data is based on hemi-anechoic chamber, during actual operation. Because of ambient conditions, these values may be somewhat different than shown.

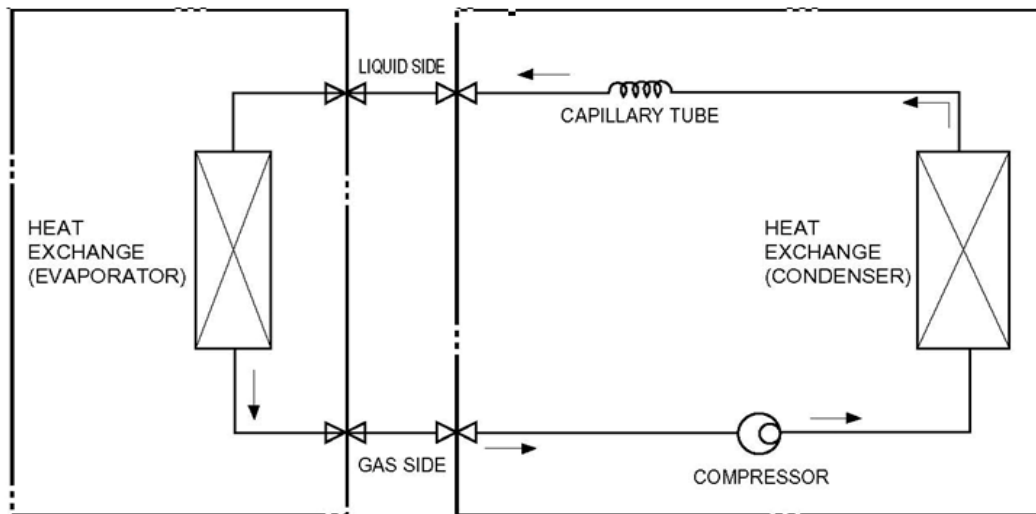
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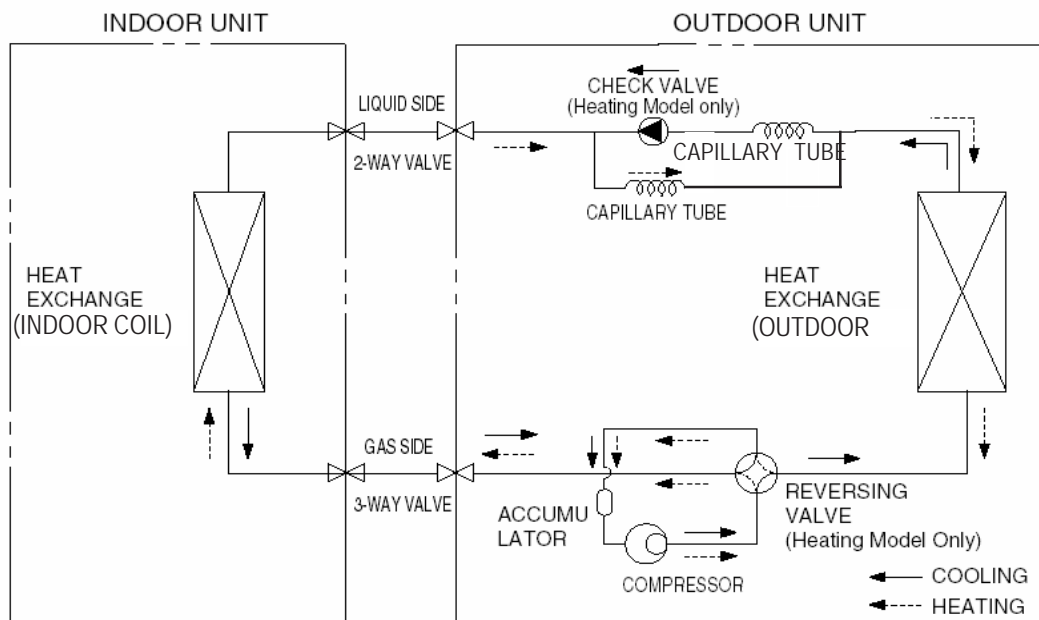
# SYSTEM OPERATION

## REFRIGERANT CYCLE

### ➤ Cooling only



### ➤ Heat pump mode



## OPERATION LIMITS

### Cooling operation

All units may operate in the cooling mode up to a maximum outdoor ambient temperature of 111°F (44°C), and down to a minimum outdoor ambient temperature of 66°F (19°C). The indoor side may be operated in the cooling mode with indoor ambient temperature between 52°F and 88°F (11°C and 31°C).

### Heating operation

Heat pump units may operate in the heating mode up to a maximum outdoor ambient temperature of 77°F (25°C), and down to a minimum outdoor ambient temperature of 16°F (-9°C). The indoor side may be operated in the heating mode with indoor ambient temperature between 59°F and 86°F (15°C and 30°C).







# REMOTE CONTROL

1. **DIGITAL DISPLAY Area:** This area will show the set temperature and, if in the TIMER mode, will show the ON and OFF settings of the TIMER. If in the FAN mode, nothing will be visible on the display.
2. **TRANSMISSION Indicator:** When the remote control transmits signals to the indoor unit, this indicator will flash one time.
3. **ON/OFF Indicator:** This symbol appears when the unit is turned on by the remote control and disappears when the unit is turned off.
4. **OPERATION MODE Indicator:** To show the current operating mode -- AUTO, COOL, DRY or HEAT (heat pump only model) or FAN mode.
5. **LOCK Indicator:** LOCK display is accomplished by pushing this button. Push the LOCK button again to unlock.
6. **TIMER DISPLAY Indicator:** Shows the settings of the TIMER. If only the starting time of the operation is set, the indicator will display TIMER ON. TIMER OFF is visible if the time is set for the unit to turn off. If both operations are set, TIMER ON-OFF will be visible and the unit will automatically turn ON and turn OFF.
7. **FAN SPEED Indicator:** Press the FAN SPEED button to select the desired fan speed setting (AUTO, LOW, MED, HIGH). Your selection will be display in the LCD window. (Auto fan speed is not displayed.)

**NOTE:** For purposes of demonstration only, all settings are shown on the Display Panel figure. During actual operation, only the relevant, functional displays are shown on the panel.

## Operating the Remote Control

### Installing and Replacing Batteries

The Remote Control requires two (2) AAA alkaline dry batteries.

1. Slide the back cover of the battery compartment and install the batteries according to the direction (+) and (-) as shown.
2. To replace old batteries, use the same procedure as in Step 1 above.

#### NOTE:

1. Do not use old or a different type battery in the Remote Control as this may cause the control to malfunction.
2. Remove the batteries if you do not use the remote control for extended periods, since battery leakage may damage the remote control.

*If batteries show signs of leakage, be careful not to get the liquid on your skin or clothes. In that event, wash well with clean water. Do not use the remote control if the batteries have leaked into it.*

*Dispose of batteries properly.*

3. The average battery life under normal use conditions is approximately 6 months.
4. Replace the batteries if there is no answering beep from the indoor unit or the Transmission Indicator light fails to light.

### Automatic Operation

Turn the power ON. The OPERATION indication lamp on the display panel of the indoor unit will flash 6 times and then automatically turn itself off.

1. Use the MODE button to select AUTO.
2. Push the TEMP button to set the desired room temperature. The most comfortable settings are between 70°F and 82°F (21°C - 28°C).
3. Push the ON/OFF button to start the air conditioner. The OPERATION lamp on the display panel of the indoor unit will light. The FAN SPEED will automatically be set so there will be no fan speed indicators shown on the display panel.
4. Push the ON/OFF button again to stop the unit's operation.

#### NOTE:

1. In the AUTO mode, the air conditioner will logically choose the mode of COOL, FAN or HEAT by sensing the difference between the actual ambient room temperature and the set temperature on the remote control.
2. Manual selection can be made if the AUTO mode does not maintain a comfortable temperature.

### COOL/HEAT (heat pump only model) and FAN Operation

1. Manually override the AUTO mode by using COOL, HEAT or FAN modes if the AUTO mode does not maintain a comfortable temperature.
2. Push the TEMP button to set the desired room temperature. When in COOLING mode, the most comfortable settings are 70°F (21°C) or above. When in HEATING mode, the most comfortable settings are 82°F (28°C) or below.
3. To select the FAN mode of AUTO, HIGH, MED or LOW, press the FAN SPEED button.
4. Press the ON/OFF button. The operation lamp lights and the air conditioner starts to operate at your desired setting. Press the ON/OFF button again to stop the unit's operation.



# SERVICE

## Torque Wrench Requirements for installation

Outside Diameter		Torque	Torque
mm	Inch	Lbs. per ft.	Kg.m
φ6.35	1/4	13	1.8
φ9.52	3/8	30	4.2
φ12.70	1/2	40	5.5
φ15.88	5/8	48	6.6
φ19.05	3/4	48	6.6

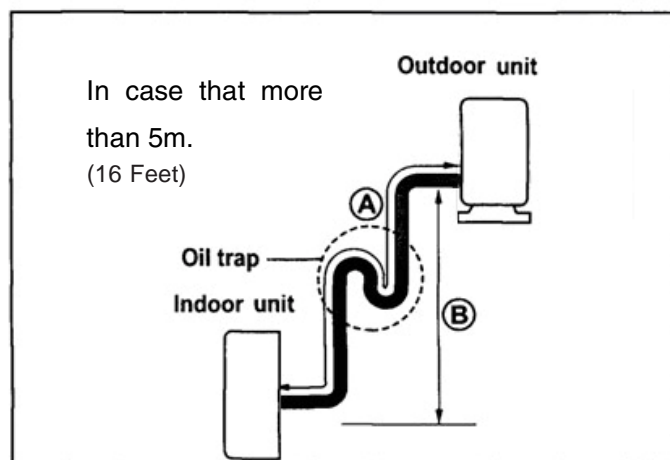
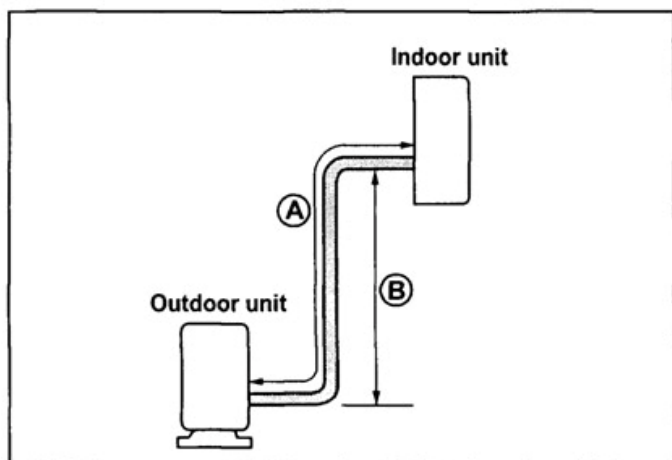
## Cable Connection

The power cord or cable connection should be selected according to this specification table.

	Unit Size		
	12	18	24
mm <sup>2</sup>	1.0	1.5	2.5
AWG	14	14	12

## Pipe Length & Elevation Requirements

Capacity	Pipe Size		Line Set Length Provided with Unit	Max Elevation	Max. Length Overall	Additional Refrigerant Per foot of Additional Line
	Vapor	Liquid				
BTUH/h	Inches (m)	Inches (m)	Feet (m)	B Feet (m)	A Feet (m)	Oz. (g/m)
12k	1/2" (φ12.7)	1/4" (φ6.35)	16 (5)	16 (5)	32 (10)	0.3 oz. (30)
18k - 24k	5/8" (φ12.7)	1/4" (φ6.35)	16 (5)	32 (10)	65 (20)	0.3 oz. (30)
	5/8" (φ12.7)	3/8" (φ9.52)	16 (5)	32 (10)	65 (20)	0.6 oz. (30)

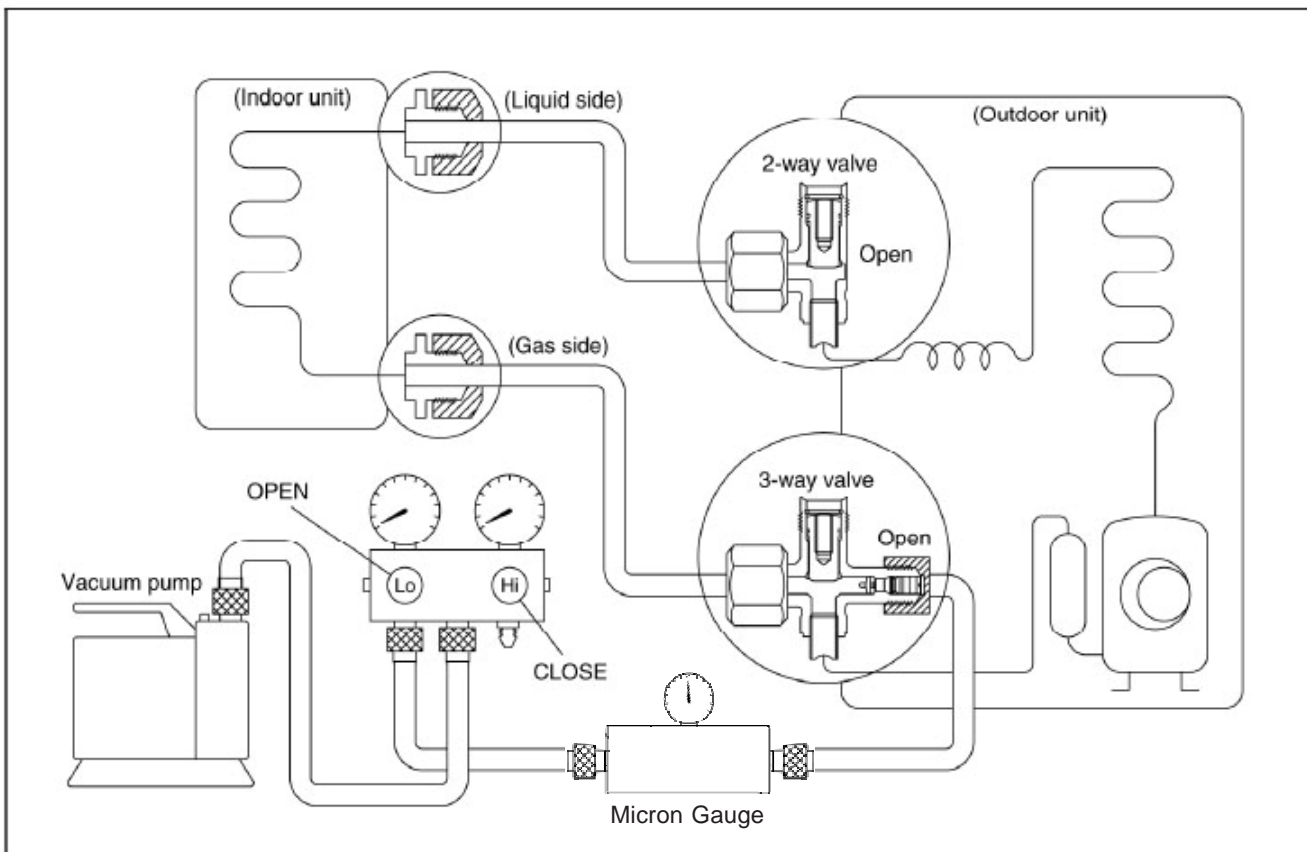


**CAUTION:** Capacity is based on standard length and maximum allowance length is based on reliability. Oil trap should be installed every 16.4 feet - 22.07 feet (5 - 7 meters.)



# SERVICE

## Evacuation



### WARNING

#### REFRIGERANT UNDER PRESSURE!

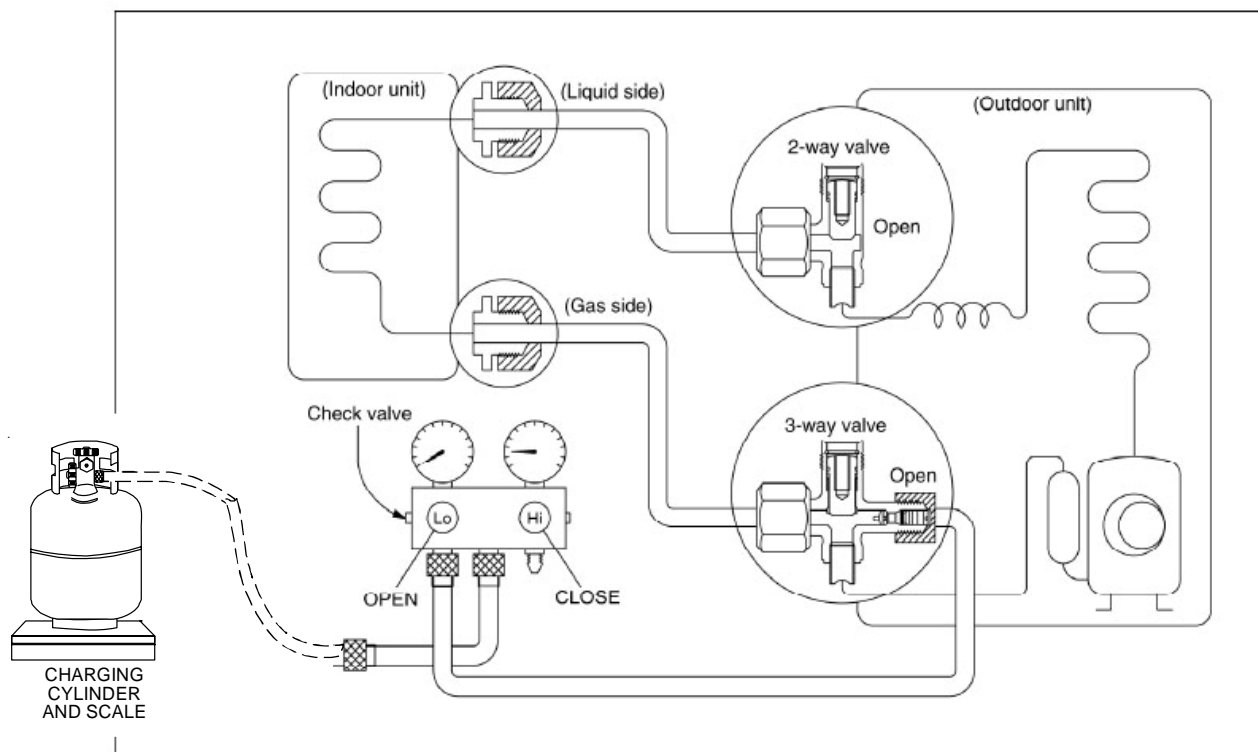
Failure to follow proper procedures may cause property damage, personal injury or death.

1. Connect the vacuum pump to the gauge manifold's center hose. Connect low pressure gauge hose to gas side of outside unit. Open low side manifold gauge valve only.
2. Evacuate for approximately one hour to 500 microns.
3. Close the valve (low side) on the charge set. Turn off the vacuum pump and make sure the micron gauge does not go above 1,000 microns in approximately 5 minutes after turning off the vacuum pump.
4. Disconnect the charge hose from the vacuum pump.  
*If the vacuum pump oil becomes dirty or depleted, replenish as needed.*



# SERVICE

## Gas Charging



### WARNING

Refrigerants are heavier than air. They can "push out" the oxygen in your lungs or in any enclosed space. To avoid possible difficulty in breathing or death:

- Never purge refrigerant into an enclosed room or space. By law, all refrigerants must be reclaimed.
- If an indoor leak is suspected, thoroughly ventilate the area before beginning work.
- Liquid refrigerant can be very cold. To avoid possible frostbite or blindness, avoid contact with refrigerant and wear gloves and goggles. If liquid refrigerant does contact your skin or eyes, seek medical help immediately.
- Always follow EPA regulations. Never burn refrigerant, as poisonous gas will be produced.

1. Connect the manifold gauge set center hose to the charging cylinder.

*(This hose was disconnected from the vacuum pump.)*

2. Purge the air from the air hose.

*Open the valve of the refrigerant cylinder and crack open the center manifold gauge hose connection at the manifold gauge set to purge the air. Follow safety procedures above on handling liquid refrigerants.*

3. Open the valve (low side) on the manifold gauge set and charge the system with R-410A vapor only.

4. Disconnect the charge hose from the 3-way valve's service port.

*Use quick disconnect hoses to ensure refrigerant is not lost during disconnect process.*

5. Replace caps to the valve stems and service port.

*Using a torque wrench, tighten the service port cap to a torque of 13 lbs. per foot.*

*Check for gas leaks.*



### WARNING

**REFRIGERANT UNDER PRESSURE!**

**Failure to follow proper procedures may cause property damage, personal injury or death.**



# SERVICE

## Electronic Control

### FUNCTION:

1. Remote receiving
2. Testing and forced running
3. Position set for indoor unit wind vane
4. LED displaying and alarm
5. ON or OFF timer
6. Protection for the compressor
7. Current protection
8. High temperature protection of indoor heat exchanger in heating mode
9. Auto defrosting and heating recovery in heating mode
10. Anti-cold air in heating mode.

ELECTRONIC CONTROL		
Input Voltage	208VAC - 230VAC	175VAC - 253VAC
Input Power Frequency	60 Hz	50 Hz
Ambient Temperature (°F)	11°F - 111°F (Cooling & Heating units)	
(°C)	-12°C - 44°C (Cooling & Heating units)	
(°F)	66°F - 111°F (Cooling only units)	
(°C)	19°C - 44°C (Cooling only units)	
Indoor Fan normal working amp	Less than 1A	
Outdoor Fan normal working amp	Less than 1.5A	
4-Way valve normal working amps	Less than 1A	
Swing motor	12V DC	
Compressor	Single phase	
	Working amp less than 15A	



# SERVICE

## Protection Features

The following features protect the reliability and life of the unit and compressor:

1. 3 minute delay for restarting the compressor.
2. Open circuit sensor protection
3. Fan speed sensor (if indoor fan speed is too low or too high, the unit will shut down).
4. Start protection (if the compressor attempts to start four times within 5 minutes, the unit will shut down, and LCD displays the failure information).
5. Overcurrent protection of the compressor.

## Fan Only Operation

Fan speed will cycle between HIGH, MED, LOW and AUTO when pressing the "FAN SPEED" button on the remote control.

## Cooling Mode Operation

For heat pump models, the reversing valve is de-energized in the cooling mode.

Upon a call for cooling (indoor room temperature rises about 1.8°F (1.0°C) more than set point):

- the compressor, outdoor fan and low speed indoor fan will turn on
- if the indoor temperature is about 7.2°F (4.0°C) more than set point, medium speed indoor fan will turn on.
- if the indoor temperature is about 9.0°F (5.0°C) more than set point, high speed indoor fan will turn on.

If the indoor coil temperature drops too low, the compressor and outdoor fan will turn off and the indoor fan will continue to run until the indoor coil temperature rises to a predetermined temperature (5 minutes minimum).

For heat pump models, if the outdoor coil temperature gets too high, the compressor and outdoor fan will turn off until the outdoor coil temperature drops to a predetermined temperature (5 minutes minimum).

## Dehumidifying Mode Operation

For extra dehumidification, the indoor fan will run on low speed. Indoor coil temperature protection is provided the same as in the cooling mode.

## Heating Mode Operation

For heat pump models, the reversing valve is energized in the heating mode (except when defrosting).

Upon a call for heating (indoor room temperature drops about 1.8°F (1.0°C) more than set point):

- the compressor and outdoor fan will turn on
- the indoor fan will delay on for short period, then will ramp up to the selected fan speed to reduce "cold-blow".
- When in the heating mode, the compressor will run for a minimum of 7 minutes.

If the indoor coil temperature rises too much, the compressor and fans will turn off.

## Defrost Mode Operation

Defrost will be initiated when:

1. outdoor coil temperature stays less than 30°F (-1°C) for more than 3 minutes, or
2. outdoor coil temperature is less than 32°F (0°C) for 90 minutes of heating operation

Defrost will be terminated when:

1. outdoor coil temperature rises to 68°F (20°C) or more
2. defrost time reaches 10 minutes

During defrost, the compressor and outdoor fan initially turn off, then after 10 seconds the indoor fan turns off, the reversing valve will shift, then 5 seconds later the compressor will turn back on. Near the end of the defrost cycle, the compressor will shut off for 25 seconds (when the compressor shuts off the outdoor fan will turn on), then just before the compressor turns back on, the reversing valve will shift back into the heating mode, and the compressor will turn back on. The indoor fan will turn back on when the indoor coil reaches a predetermined temperature.

## Automatic Changeover Mode Operation

- If the room temperature is about 1.8°F (1.0°C) below the set point, then the unit will turn on in the heating mode.
- If the room temperature is about 1.8-3.6°F (1.0-2.0°C) above the set point, then the unit will turn on in the cooling mode.
- If the room temperature is close to set point, then unit will run in the fan only mode.
- Once the unit comes on in one mode of operation, it will not turn to the other mode of operation for at least 15 minutes.
- The motion of the directional louvers should be set appropriately for the operational mode (the direction of the louvers do not change automatically with the change in operation mode).



# SERVICE

## Forced Cooling Operation

Continuous cooling operation can be forced by selecting the FORCED COOLING button or switch. The unit will operate for 30 minutes continuously in the cooling mode, regardless of the indoor temperature. After 30 minutes the set point becomes 75°F (24°C) and the unit operates in the Dehumidifying Mode. Note that all protections from the Cooling Mode and Dehumidifying Mode apply.

## Forced Automatic Operation

Forced automatic operation can be forced by selecting the FORCED AUTO button or switch. The temperature set point will be 75°F (24°C).

Operation can be changed from Remote Mode to Forced Auto to Forced Cooling (then back to Remote Mode) by button selection on the remote.

## Sleep Mode Operation

Sleep mode function is available for cooling, heating or automatic modes.

The set point temperature will rise (when cooling) or drop (when heating) about 1.8°F (1.0°C) per hour for 2 hours, then the air circulation of low speed indoor fan will turn on. After 7 hours total, then unit will turn off.

## Auto Restart Function

In the event of a sudden power failure, the unit is programmed to return to the previous settings before the power failure.

## Turbo Mode

For 12K models only, the indoor fan will operate in HIGH speed when the "TURBO" button on the remote is pressed. The unit will return to normal speed when "TURBO" button is pressed again. (TURBO MODE will be cancelled if the operation mode is changed, Forced Cooling mode is selected, or the unit is turned off). NOTE: SLEEP MODE is not available while in TURBO MODE.

## Display Board

"OPERATION" indicator flashes once every second after power is on and is turned on continuously when the air conditioner is in operation.

"TIMER" indicator turns on when the TIMER is set to ON.

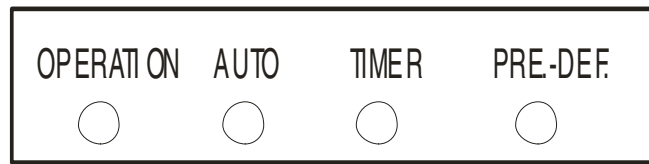
If the outdoor unit starts defrosting "PRE-DEF" indicator is turned on.

"AUTO" indicator is turned on when Automatic Mode is selected (18K & 24K models only).



# TROUBLESHOOTING

## Display Board (18k and 24k MODELS)



### Operation:

The indicator flashes once every second after the power is on and will be illuminated when the unit is in operation.

### TIMER Indicator:

The indicator illuminates then TIMER is set ON.

### PRE-DEF. Indicator (For cooling & heating mode only - for cooling only, it's FAN ONLY):

The air conditioner begins defrosting automatically if the outdoor unit frosts in heating operation. At this time, PRE-DEF. indicator illuminates.

*For cooling only:* when the unit operates in FAN ONLY mode, the FAN ONLY indicator illuminates.

### AUTO Indicator:

This indicator will flash when the air conditioner is in AUTO operation.

### 12K Models

Mode	Operation Lamp	Timer Lamp
Indoor fan speed is abnormal for over 1 minute	★	x
Indoor room temperature or evaporator sensor is open circuit or short circuit	★	ON
Overcurrent protection of the compressor occurs 4 times	x	★
Control Board error	ON	★
Indoor unit communication error	★	★
Outdoor condenser temperature sensor is open circuit or short circuit	★	★

Illuminates simultaneously

Illuminates alternately

x = Off      ★ = Flashing

### 18K & 24K Models

Mode	Operation Lamp	Timer Lamp	Defrosting Lamp	Auto Lamp
Overcurrent protection of the compressor occurs 4 times	★	★	★	★
Indoor room temperature sensor is open circuit or short circuit	x	★	x	x
Temperature sensor on indoor evaporator is open circuit or short circuit	★	x	x	x
Temperature sensor on outdoor condenser is open circuit or short circuit (without for cooling only models)	x	x	★	x
Outdoor unit protects (outdoor temperature sensor, phase, order, etc.)	x	x	★	★
Control Board error	x	★	x	★
Indoor unit communication error	x	x	x	★

x = Off      ★ = Flashing



**WARNING**

**HIGH VOLTAGE!**  
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

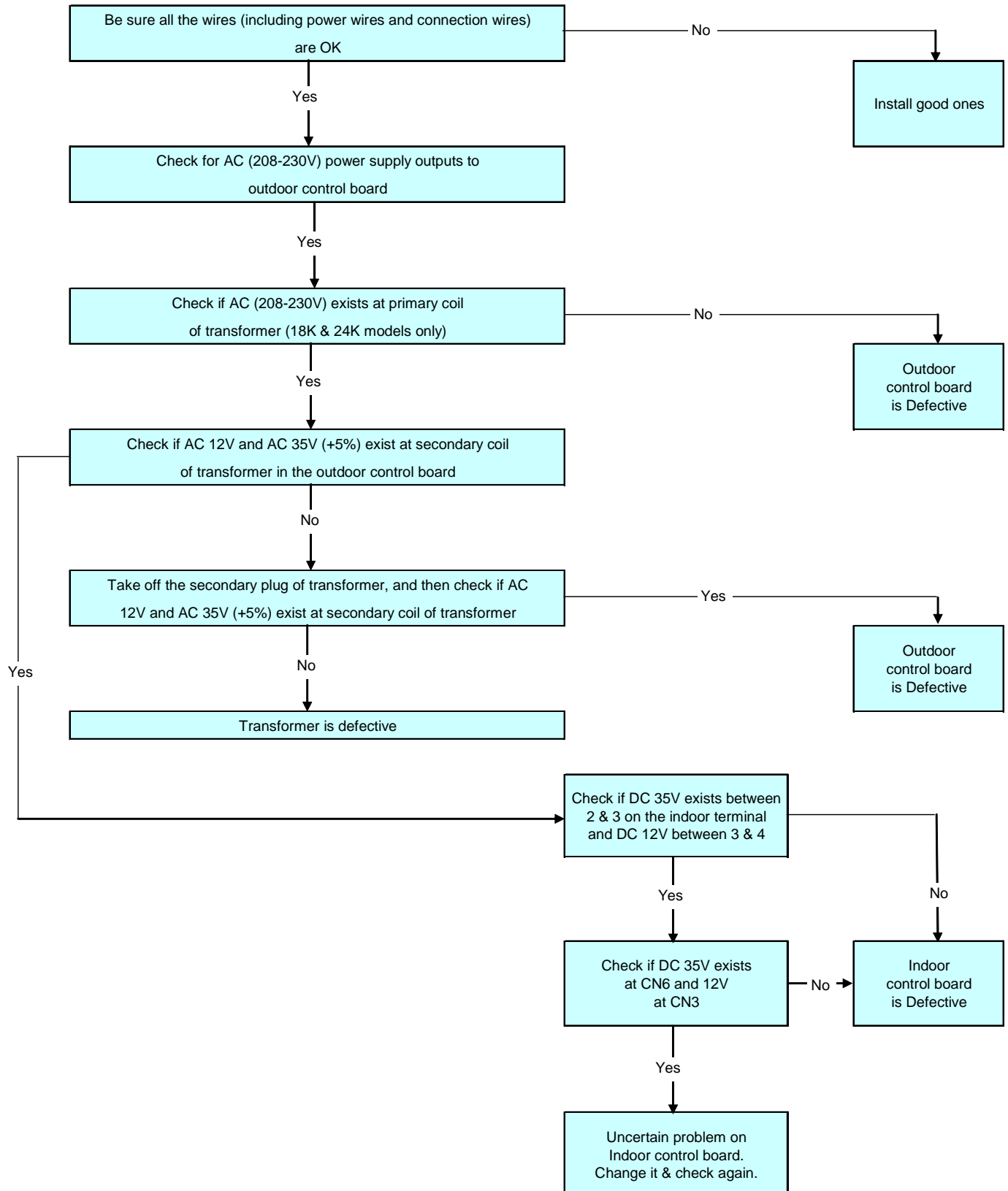




# TROUBLESHOOTING

## Diagnostic Chart (for 12k Models)

If, after energizing the unit, no indicator is lit and the unit cannot be operated, see the following chart.

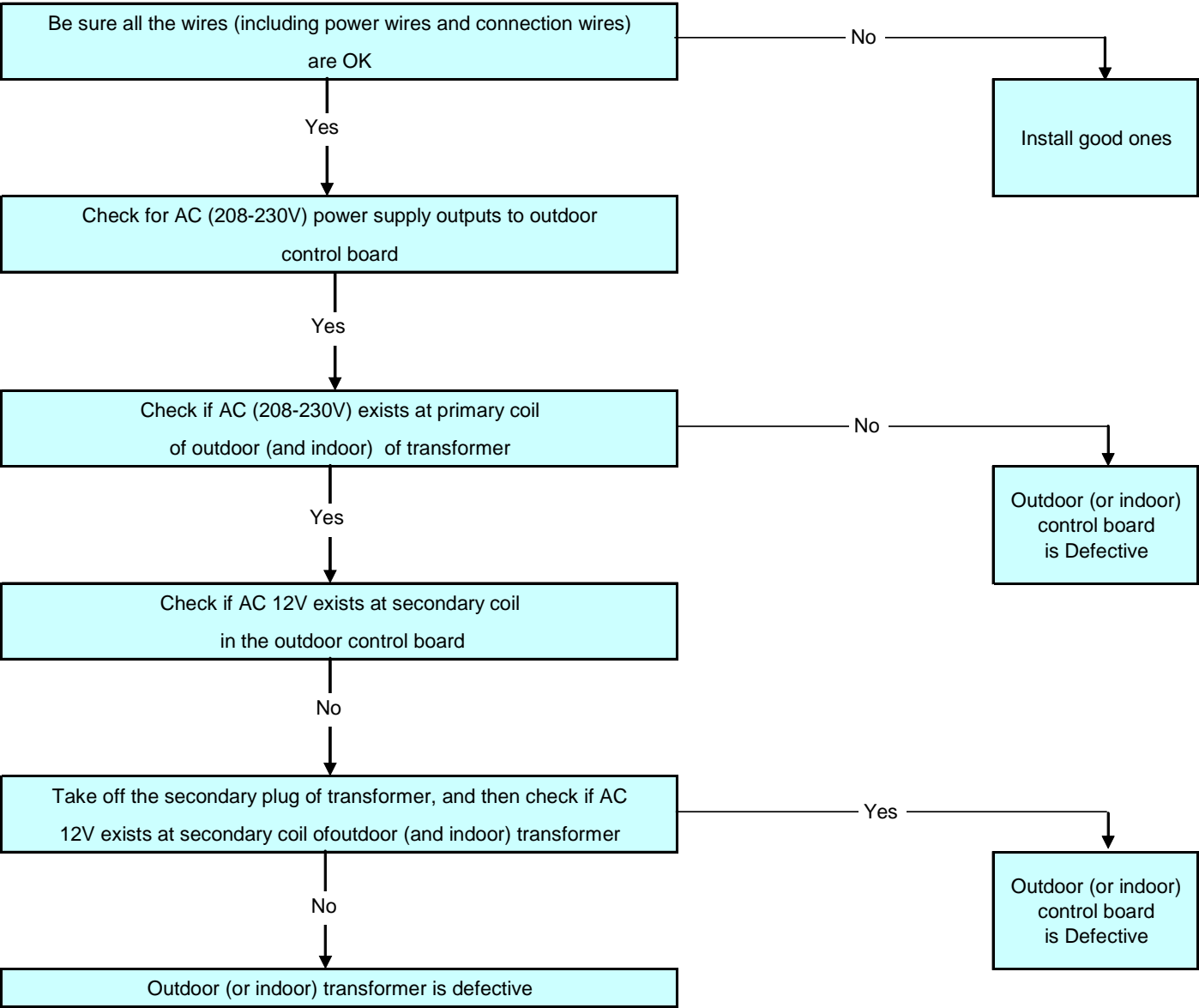




# TROUBLESHOOTING

## Diagnostic Chart (for 18k & 24k Models)

If, after energizing the unit, no indicator is lit and the unit cannot be operated, see the following chart.

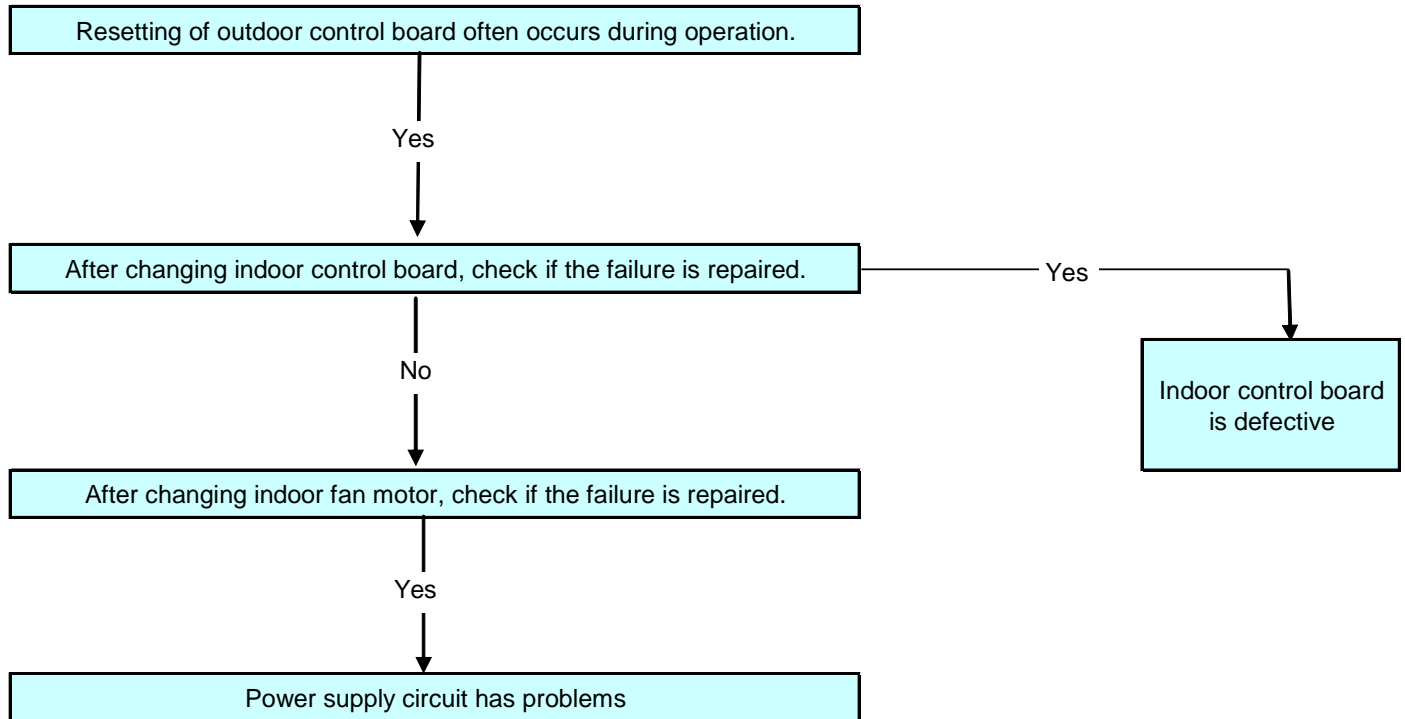




# TROUBLESHOOTING

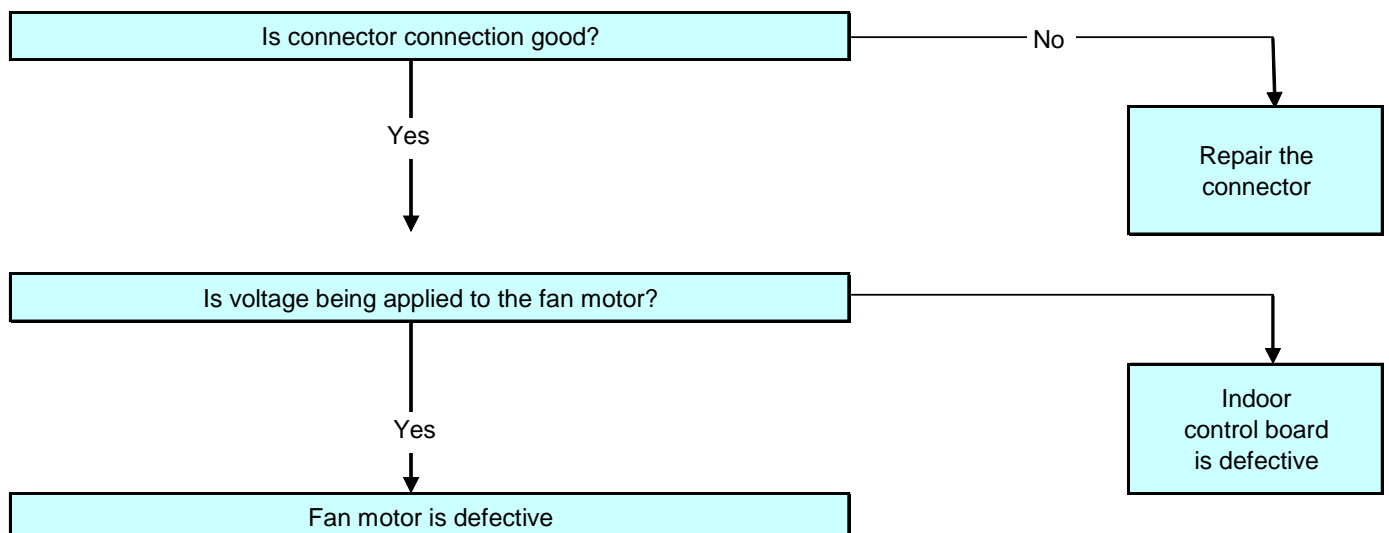
## Resetting of Outdoor Control Board Occurs Often During Operation:

If the power is on and the unit automatically enters into reset mode, the instantaneous voltage of the main chip is less than 4.5v. Check according to the following procedure:



## Indoor Fan Speed Not Responding Properly (12k Models Only)

If the indoor fan speed has been unresponsive for over 1 minute:

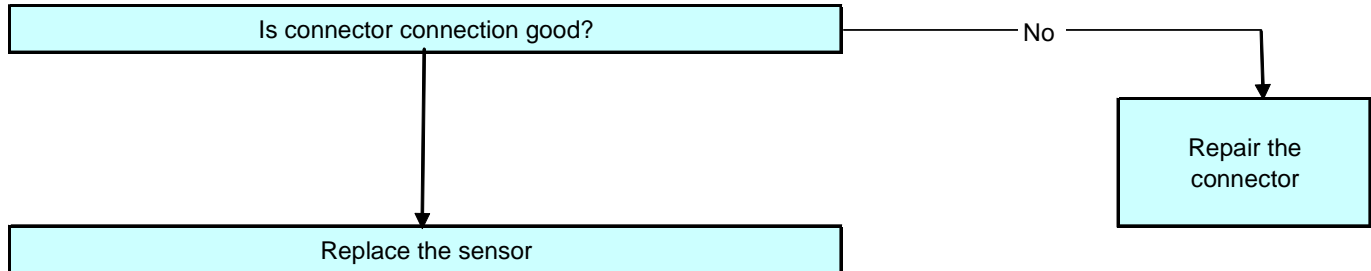




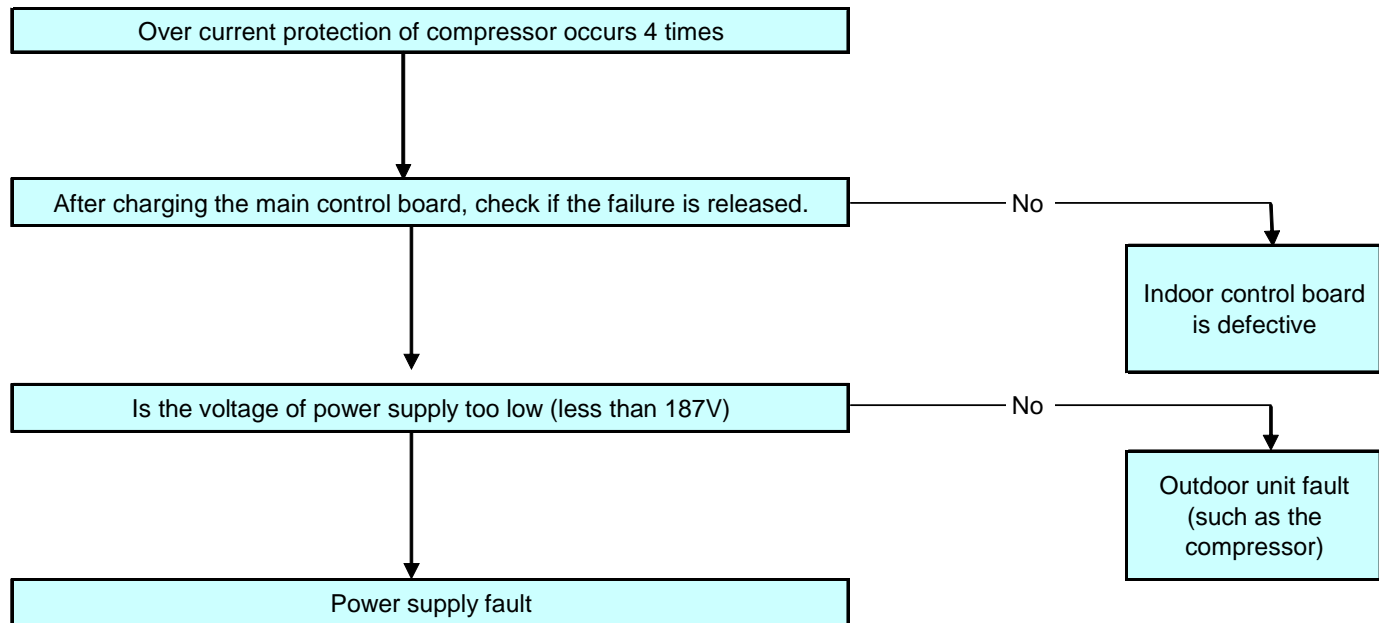
# TROUBLESHOOTING

## Temperature Sensor Error:

These sensor errors include the indoor room sensor, the indoor evaporator sensor and the outdoor condenser temperature sensor.



## Overcurrent Protection of the Compressor occurs 4 times:



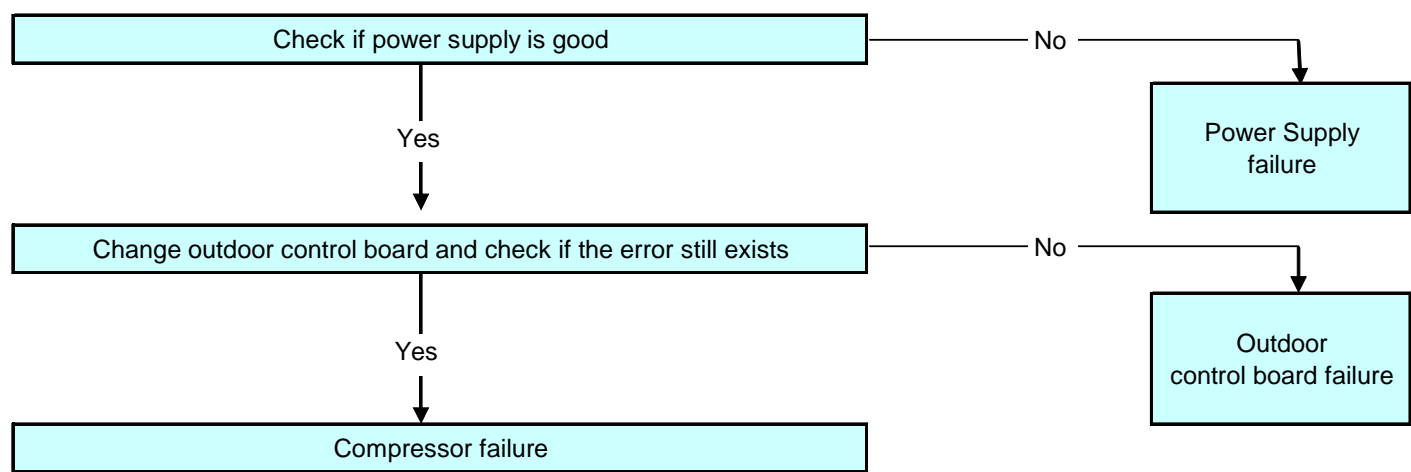
## EEROM Error:

If you receive the EEROM error, this indicates that the indoor control board is defective.

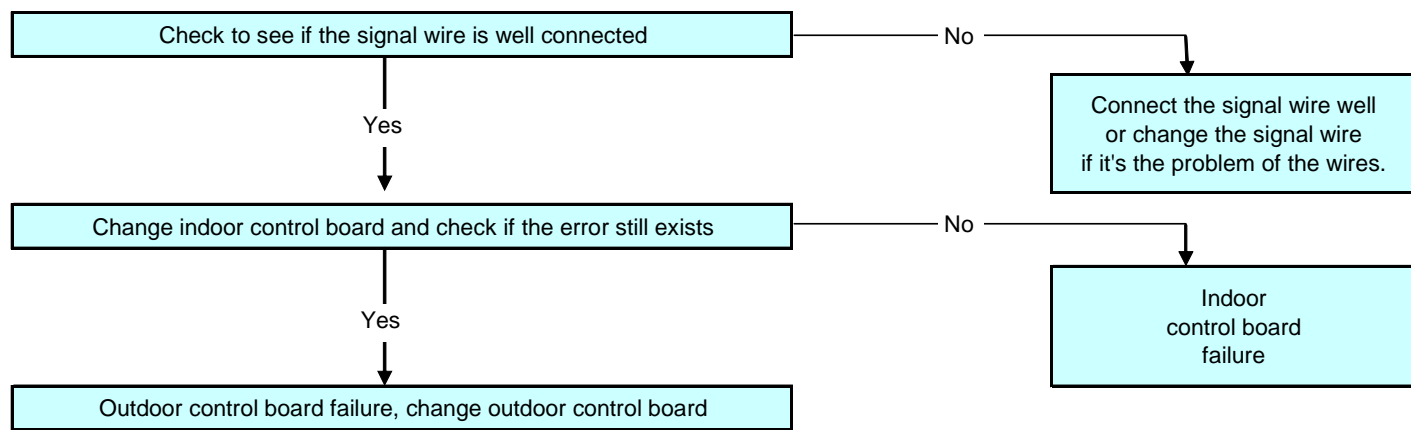


# TROUBLESHOOTING

## Outdoor Unit Fails to Operate:



## Indoor Unit Communication Error:





# TROUBLESHOOTING

## Temperature Sensor Data:

Temp. °F	Temp. °C	Resistance KΩ	Temp. °F	Temp. °C	Resistance KΩ	Temp. °F	Temp. °C	Resistance KΩ
14	-10	62.3	63	17	14.6	111	44	4.4
16	-9	58.7	64	18	13.9	113	45	4.2
18	-8	56.4	66	19	13.3	115	46	4.0
19	-7	52.2	68	20	12.6	117	47	3.9
21	-6	49.3	70	21	12.1	118	48	3.8
23	-5	46.6	72	22	11.5	120	49	3.6
25	-4	44.0	73	23	11.0	122	50	3.5
27	-3	41.6	75	24	10.5	124	51	3.3
28	-2	39.8	77	25	10.0	126	52	3.2
30	-1	37.2	79	26	9.6	127	53	3.1
32	0	35.2	81	27	9.1	129	54	3.0
34	1	33.3	82	28	8.7	131	55	2.8
36	2	31.6	84	29	8.3	133	56	2.7
37	3	30.0	86	30	8.0	135	57	2.6
39	4	28.3	88	31	7.6	136	58	2.5
41	5	26.9	90	32	7.3	138	59	2.4
43	6	25.5	91	33	7.0	140	60	2.4
45	7	24.2	93	34	6.7	142	61	2.3
46	8	22.6	95	35	6.4	144	62	2.2
48	9	21.8	97	36	6.1	145	63	2.1
50	10	20.7	99	37	5.9	147	64	2.0
52	11	19.7	100	38	5.6	149	65	2.0
54	12	18.7	102	39	5.4	151	66	1.9
55	13	17.8	104	40	5.2	153	67	1.8
57	14	16.9	106	41	5.0	154	68	1.8
59	15	16.1	108	42	4.8	156	69	1.7
61	16	15.3	109	43	4.6	158	70	1.6



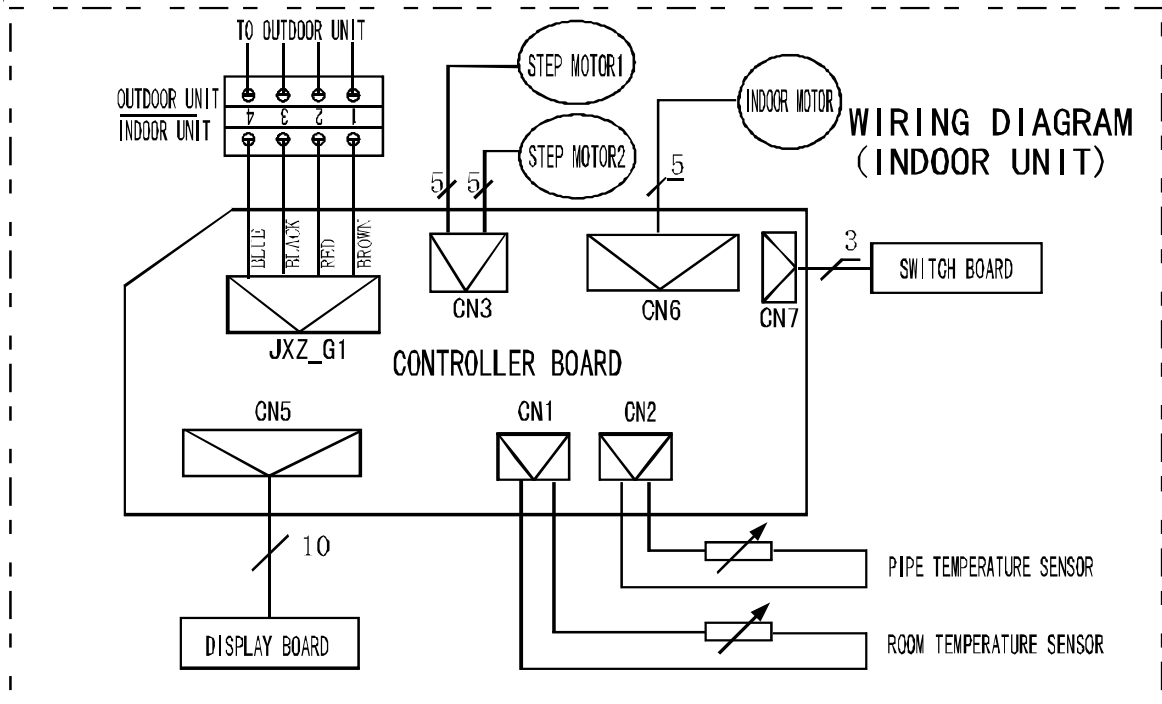
# WIRING DIAGRAMS

**WARNING**

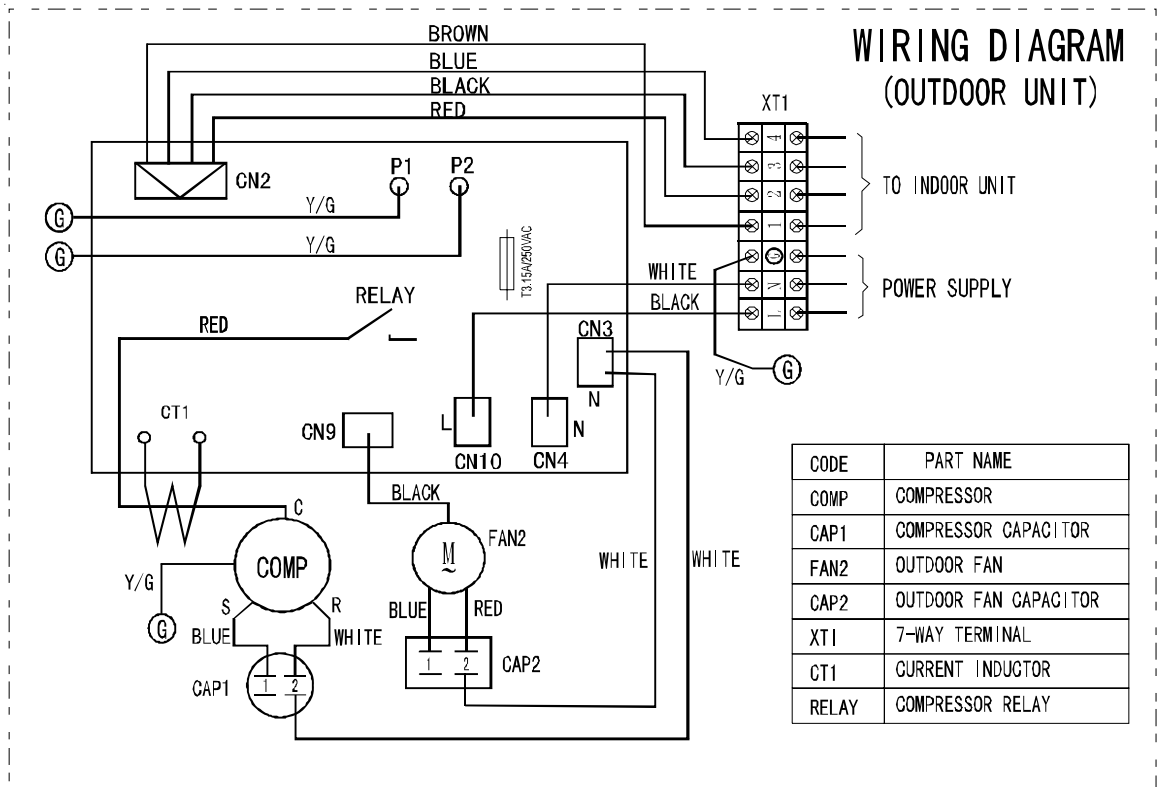
**HIGH VOLTAGE!**  
 DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

## MSG-12CRN1

### INDOOR UNIT



### OUTDOOR UNIT





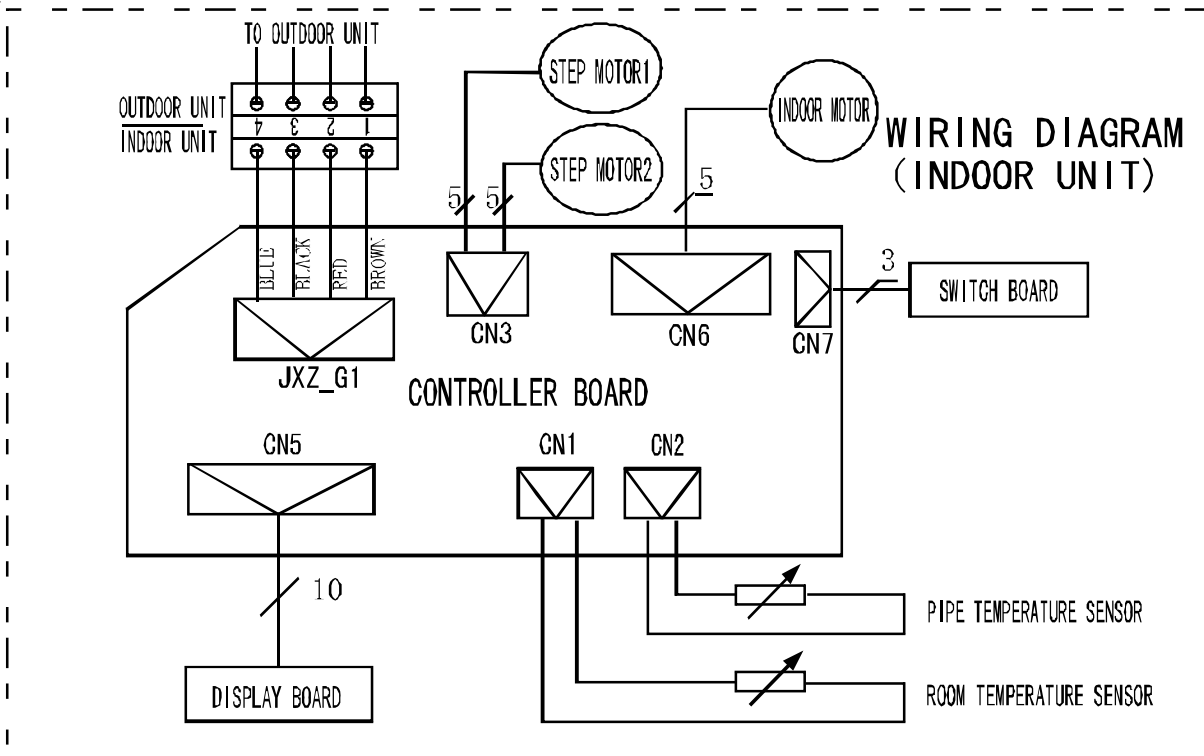
## WIRING DIAGRAMS



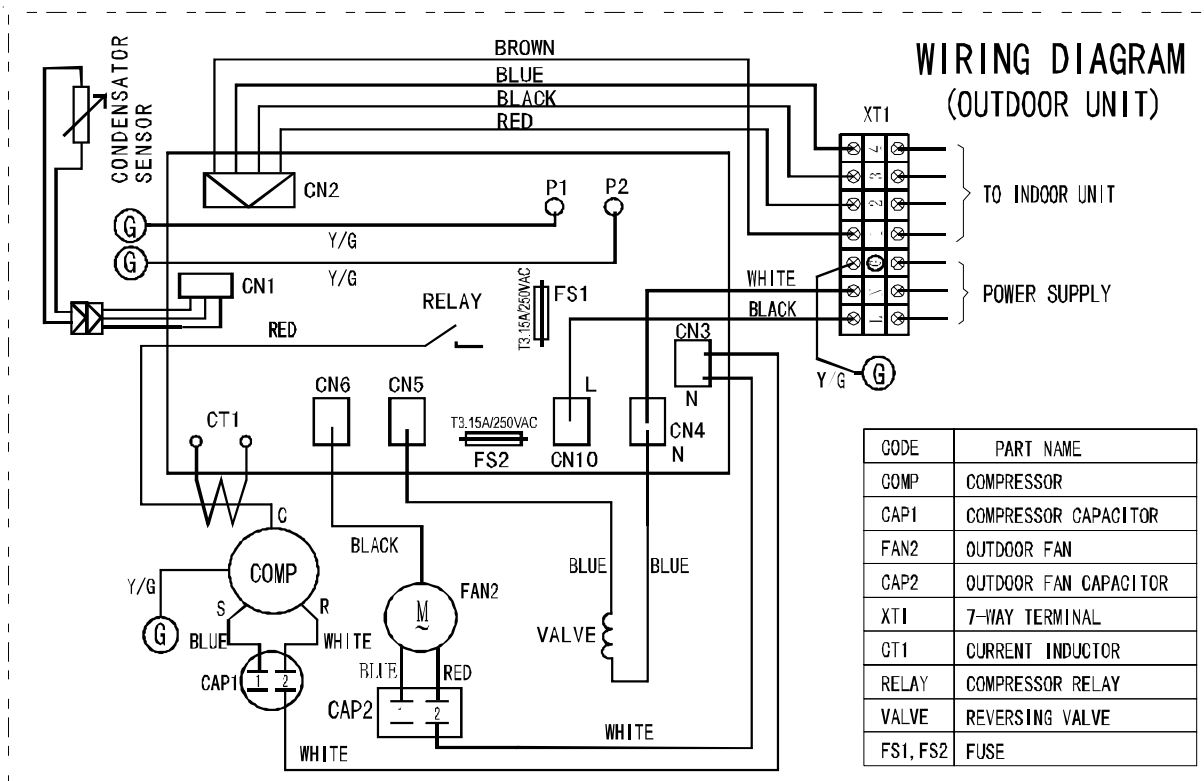
ATH.

**MSG-12HRN1**

## INDOOR UNIT



## OUTDOOR UNIT





# WIRING DIAGRAMS



## WARNING

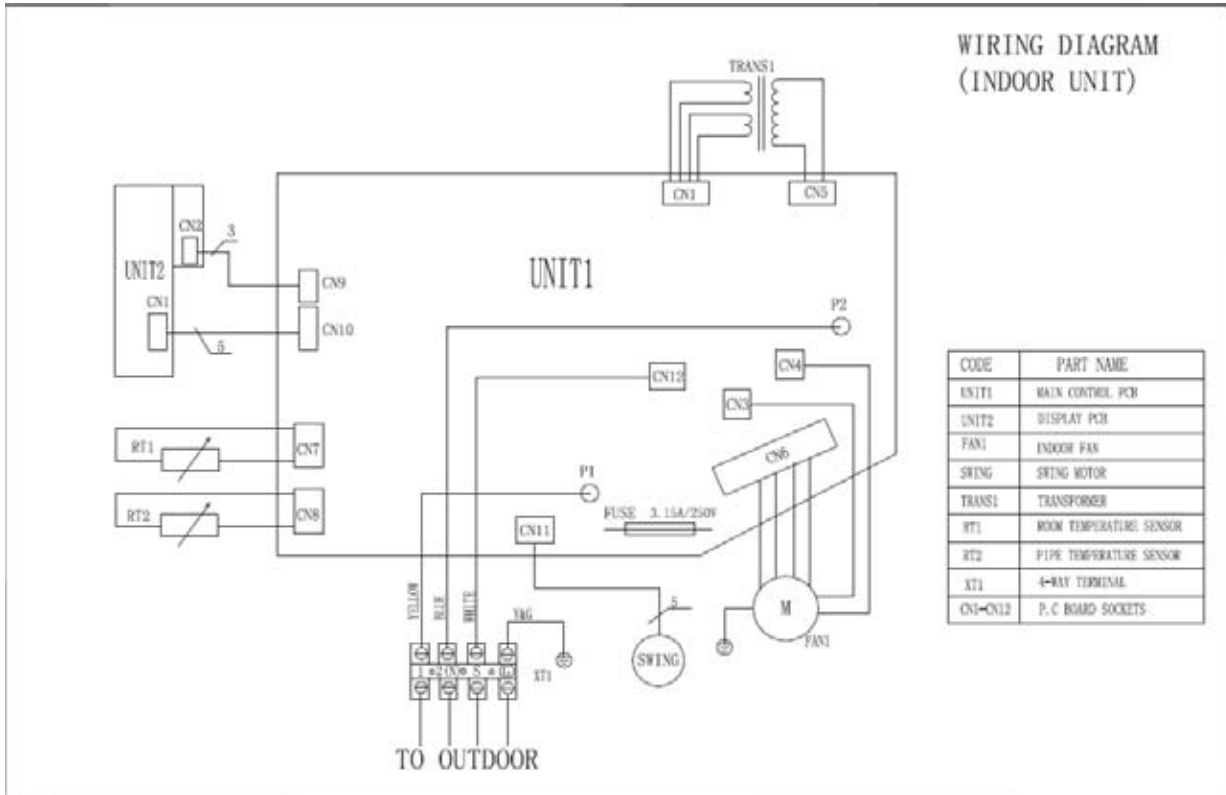
HIGH VOLTAGE!

DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.

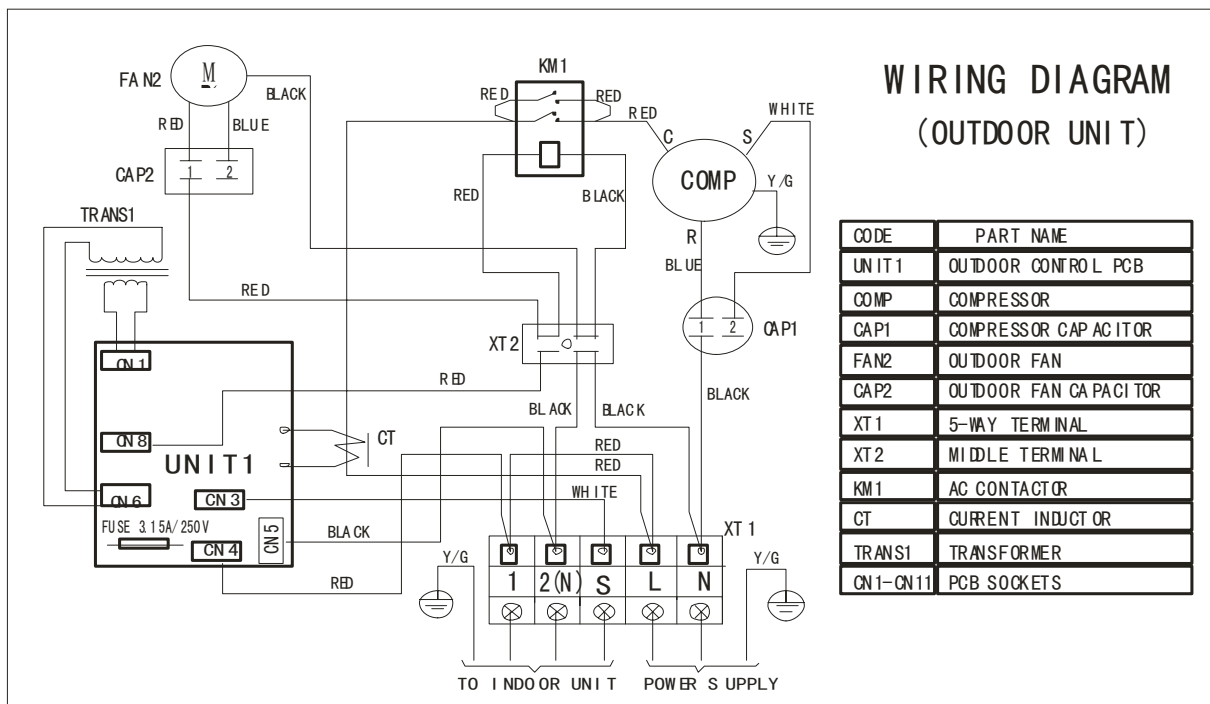


### MSG-18CRN1 MSG-24CRN1

Indoor unit:



Outdoor unit





## WIRING DIAGRAMS

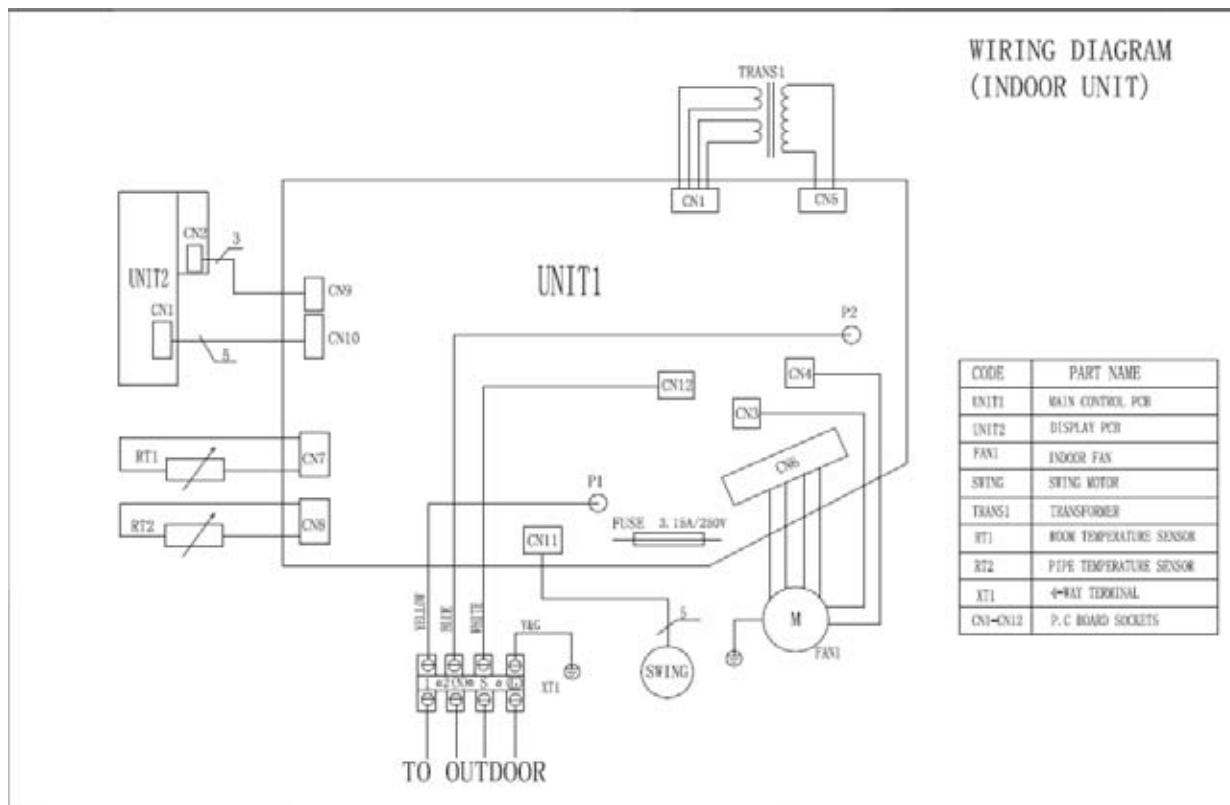


**HIGH VOLTAGE!**  
DISCONNECT ALL POWER BEFORE SERVICING OR INSTALLING THIS UNIT. MULTIPLE POWER SOURCES MAY BE PRESENT. FAILURE TO DO SO MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR DEATH.



**MSG-18HRN1    MSG-24HRN1**

**Indoor unit:**



## Outdoor unit

